

## **POWERED COPING SAW**

I CLAIM:

1. A saw including:

- 2        a blade assembly having a proximal end; said blade assembly including:
  - 4              an elongate, thin blade having a longitudinal axis including
    - 6              a proximal end; and
    - 8              a distal end; and
  - 10          a rigid frame including:
    - 12              a proximal end connected to said proximal end of said blade; and
    - 14              a distal end connected to said distal end of said blade; said frame for supporting said blade in tension;
  - 16          a housing including:
    - 18              handle means for holding said saw in a hand,
    - 20              a rotary motor mounted to said housing including:
      - 22              a drive shaft rotating about a shaft axis including:
        - 24              a front end;
        - 26              power means for powering said motor;
        - 28              a piston slideably and non-rotatably supported in said housing including:
          - 30              a front end connected to said proximal end of said blade assembly for moving said blade assembly along the longitudinal axis of said blade coincident with piston movement; and
          - 32              a rear end; and
        - 34              motion converter means for connecting said front end of drive shaft to said rear end of said piston for converting rotary motion of said drive shaft into reciprocating linear motion of said piston.

2. The saw of Claim 1 wherein said motion converter means includes:

- 2        an exterior surface on said drive shaft front end including:

circumferential raceway in a plane at an angle to the shaft axis;  
4        a cap on said rear end of piston having an inside surface; said cap fitting over said exterior surface of said front end of said drive shaft; and  
6        coupling means moving in said raceway for coupling with said cap to move said cap.

3. The saw of Claim 2 wherein:

2        said circumferential raceway is semicircular in cross-section; and  
          said coupling means includes:  
4              a hemispherical orifice in said interior surface of said cap; and  
            a ball bearing coupling said raceway and said hemispherical orifice.

4. A saw including:

2        a blade assembly having a proximal end; said blade assembly including:  
          an elongate, thin blade having a longitudinal axis including  
4              a proximal end; and  
            a distal end; and  
6        a rigid frame including:  
          a proximal end connected to said proximal end of said blade; and  
8            a distal end connected to said distal end of said blade; said frame for supporting said blade in tension;  
10        a generally cylindrical, elongate housing having a longitudinal axis and an outside surface adapted for holding said saw in a hand,  
12        a rotary motor mounted within said housing including:  
          a drive shaft rotating about a shaft axis; the shaft axis parallel to the housing  
14        axis; said drive shaft including:  
            a front end;  
16        power means for powering said motor;  
          a piston slideably and non-rotatably supported in said housing so as to be movable  
18        parallel to the housing axis; including:  
            a front end connected to said proximal end of said blade assembly for

20 moving said blade assembly along the longitudinal axis of said blade coincident with piston movement; and  
22 a rear end, and  
24 motion converter means for connecting said front end of drive shaft to said rear end of said piston for converting rotary motion of said drive shaft into reciprocating linear motion of said piston.

5. The saw of Claim 4 wherein said motion converter means includes:

2 an exterior surface on said drive shaft front end including:  
4 circumferential raceway in a plane at an angle to the shaft axis;  
6 a cap on said rear end of piston having an inside surface; said cap fitting over said exterior surface of said front end of said drive shaft; and  
6 coupling means moving in said raceway for coupling with said cap to move said cap.

6. The saw of Claim 5 wherein:

2 said circumferential raceway is semicircular in cross-section; and  
4 said coupling means includes:  
4 a hemispherical orifice in said interior surface of said cap; and  
a ball bearing coupling said raceway and said hemispherical orifice.

7. The saw of Claim 4 wherein:

2 said motor is an electric motor.

8. The saw of Claim 7 wherein:

2 said power means is an electrical cord.

9. In combination:

2 a full dental arch model including:  
4 a positive die of a full dental arch including:  
gums; and

a plurality of teeth; and

6           an arch plate connected to said die; said full arch model being U-shaped in top view with opposing left and right sections;

8           a coping saw for cutting individual dies from said dental model including:

          a blade assembly having a proximal end; said blade assembly including:

10           an elongate, blade having a longitudinal axis and having a thickness adapted for cutting individual dies from said model including

12           a proximal end; and

          a distal end; and

14           a rigid frame including:

          a proximal end connected to said proximal end of said blade; and

16           a distal end connected to said distal end of said blade; said frame for supporting said blade in tension;

18           a housing including:

          handle means for holding said saw in a hand,

20           a rotary motor mounted to said housing including:

          a drive shaft rotating about a shaft axis including:

22           a front end;

          power means for powering said motor;

24           a piston slideably and non-rotatably supported in said housing including:

          a front end connected to said blade assembly for moving said blade assembly

26           along the longitudinal axis of said blade coincident with piston movement; and

          a rear end; and

28           motion converter means for connecting said front end of drive shaft to said rear end of said piston for converting rotary motion of said drive shaft into reciprocating

30           linear motion of said piston such that said resulting stroke length of said blade assembly is less than the distance between opposing U-sections along a cut line.

10. The combination of Claim 9 wherein:

2           said housing is generally cylindrical and elongate having a longitudinal axis and an outside surface adapted for holding said saw in a hand.

11. The combination of Claim 10 wherein:

- 2       the shaft axis of said drive shaft is parallel to the housing axis; and  
said piston moves parallel to the housing axis.

12. The combination of Claim 9 wherein said motion converter means includes:

- 2       an exterior surface on said drive shaft front end including:  
                circumferential raceway in a plane at an angle to the shaft axis;  
4       a cap on said rear end of piston having an inside surface; said cap fitting over said  
exterior surface of said front end of said drive shaft; and  
6       coupling means moving in said raceway for coupling with said cap to move said  
cap.

13. The combination of Claim 12 wherein:

- 2       said circumferential raceway is semicircular in cross-section; and  
said coupling means includes:  
4       a hemispherical orifice in said interior surface of said cap; and  
                a ball bearing coupling said raceway and said hemispherical orifice.

14. The combination of Claim 9 wherein:

- 2       said motor is an electric motor.

15. The combination of Claim 14 wherein:

- 2       said power means is an electrical cord.